CLASS II.—HETEROMORPHIC TUMOURS.

ORDER I.—Solid Heteromorphic Growths.

*First Species.* Tubercle.
*Second Species.* Typhus Matter.
*Third Species.* Thnétoblastic, or Fatal Cancer.
*Fourth Species.* Heterodenic—Butyroidal Sacs.
*Fifth Species.* Tumours resulting from Anatomical Wounds.

ORDER II.—Liquid Heteromorphic Tumours.

*First Species.* Purulent—Abscess—Anthrax—Furuncle.
*Second Species.* Parasitic Tumours—Cysticercus Hydatids with Echinococci—Hydatids without Echinococci.

In our summary we call disease any disorder of the forces or of the constituent parts of the body. But, absolutely, there is no health. There is always disease, with more or less of actual and prospective manifestation. There is always a disturbance from the too much or the too little, if not from empoisonment or other harmful absorption. There is no more likelihood of absolute health than of an absolute quietude of the winds, or an absolute electrical equilibrium. So long as there is variableness of temperature, so long will there be disturbances of the media, and so long disturbance of the functions of organisms. As long as the sun shines will continents upheave, and blastemata degenerate. When will the media be at rest? Not till then will the forces and the elements within the body of man be at rest.

So long as the sun chimes in with the music of his brother spheres, and the pomp of the earth revolves, and the "brightness of paradise alternates with deep-fearful night"—and the "sea foams up in broad waves," and storms roar—so long shall the body of man be sick, and his mind unstable; so long shall there be sins for repentance and sorrow for consolings. As long as aggregate cytoblasts shall be prone to disturbances, so long shall masses of men be liable to revolutions and conflicts. So long as there shall be social sins and degradations, so long shall there be maladies of individual organisms.

Thus "all revolves into the whole, and through *the* All, ring harmoniously all the heavenly influences." C. F. H.

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Art. XV.—*Human Histology, in its Relations to Descriptive Anatomy, Physiology, and Pathology.* With 434 Illustrations on Wood. By E. R. Peaslee, A. M., M. D., Prof. of Physiology and Pathology in the New York Medical College, of Anatomy in Dartmouth College, and of Surgery in the Medical School of Maine, &c. &c. Philadelphia: Blanchard & Lea, 1857. 8vo. pp. 618.

The plan of Prof. Peaslee's book is to combine in a single volume a description of the ultimate chemical elements entering into the composition of the human body, that of the proximate principles, of the anatomical or structural elements, and of the tissues proper, together with some account of their healthy functions, and the morbid alterations to which they are subject in disease. The first part is accordingly devoted to the consideration of the chemical elements and the proximate principles; and the second part to the more purely anatomical description of the minute forms and structures demonstrable by the microscope.

The consideration of the ultimate chemical elements of the animal frame, naturally requires but a very limited space. It amounts, properly, to little more than an introduction to the main subjects of the work. For a knowledge of the ultimate elements into which the animal solids and fluids can be decomposed by chemical operations, though essential as a basis to the commencement of anatomical and physiological studies, really carries us onward but a very short distance in their prosecution. The cases are quite rare, in the present state of our scientific attainments, in which any important anatomical or physiological question can be decided by investigations in that direction.

We may indeed determine, as Boussingault has done, by comparing the total quantity of nitrogen taken in with the food with that discharged in the excretions, whether this substance be habitually absorbed or eliminated in the process of respiration; and in some instances the presence or absence of the same element becomes an important distinctive characteristic of various animal substances. But the business of the anatomist and physiologist is, after all, mostly with the proximate principles, and not with the ultimate elements of which they are composed. The characters of the former are, to a great extent, peculiar, and their transformations in the living body readily subject to observation. The latter are not at all distinctive of organized bodies, and the changes which they undergo in the animal economy are, for the most part, too obscure to be followed by the contrivances of the experimenter.

In describing the proximate principles, the author has adopted the plan of Robin and Verdeil, first brought forward in their admirable work on *Physiological and Anatomical Chemistry*, published at Paris in 1853, and which was reviewed in our number for July last (*see* p. 158, *et seq.*) It is very gratifying to see that the views advanced in this work, so full of originality, and at the same time so extremely useful in their application, have met with a generally prompt and cordial reception on this side the Atlantic. The true nature and relations of the proximate principles, and the manner in which they should be studied, were indeed never fairly understood before the appearance of Robin and Verdeil's book. They treated the subject from an entirely novel point of view, but one which seems only to have required a fair and distinct announcement to be almost universally acknowledged as correct. A proximate principle, according to this view of the matter, is a substance which may be extracted from an animal solid or fluid by means which do not destroy or alter its chemical nature and properties. Proximate principles may, in fact, be said to exist in all homogeneous solids and fluids of mixed composition, and may be extracted from them by the same means as in the case of the animal tissues and secretions. Thus, in a watery solution of sugar, we have two proximate principles; 1st, the water, and 2d, the sugar. The water may be separated by evaporation and condensation, after which the sugar remains behind in a crystalline form. These two substances have therefore been simply *separated* from each other. They have not been decomposed, nor their chemical properties altered. On the other hand, the oxygen and hydrogen of the water were not proximate principles of the original solution; for they did not exist in it under their own forms, but only in a state of combination, and in the form of water—a fluid whose physical and chemical properties are entirely different from theirs. If we wish to ascertain, accordingly, the nature and properties of a saccharine solution, it will afford us but little satisfaction to subject such a solution to an elementary analysis; for its nature and properties depend not so much on the presence of the ultimate elements—oxygen, hydrogen, and carbon—as on the particular forms of combination (water and sugar) under which they exist.

These considerations, which are so plain in regard to a simple fluid like a watery solution of sugar, become still more important when applied to mixtures of a complicated character, such as the animal tissues and fluids. In examining these substances, their ingredients must be, as above, simply *separated* from each other, not decomposed. The analysis of an animal solid or fluid is therefore properly an anatomical operation, and not a chemical one, and must be conducted from an anatomical point of view, so as to produce results useful to the anatomist and physiologist. So fully was Robin impressed with this idea, that he at first wished to adopt for his book the title, *Fundamental Anatomy and Physiology*, instead of *Anatomical and Physiological Chemistry*. Though the former would have been altogether the more correct title, in a scientific point of view, he adopted the second, "in order," as he expressed it, "not to break away too suddenly from the established association of ideas, and thereby run the risk of not being fully understood."

Since the investigation of the proximate principles, therefore, is really to be regarded as an anatomical and not as a chemical pursuit, it very properly precedes the study of microscopic anatomy, which is to carry us one step farther in the examination of the complicated structure of the animal frame. Robin's *Chimie Anatomique* was, in fact, designed by him as the introduction to a work on *Minute or General Anatomy*, which has yet to make its appearance.

Dr. Peaslee has united the two subjects, as we have mentioned above, in a single volume, but has retained the order of precedence, treating first of the proximate principles, and afterward of the minute anatomical forms of which the tissues are composed.

The water, for example, which enters, as a proximate principle, into the composition of different parts of the animal frame, is to be extracted and examined as in the case of the simple saccharine solution above mentioned. All the animal solids and fluids, without exception, are thus found to contain a certain proportion of water, which may be separated by the process of evaporation. The water, furthermore, which is obtained in this way, from the solids as well as from the fluids, is not simply entangled in the interstices of the former, but actually united everywhere with their substance. The peculiarity of the condition, therefore, under which the water exists in the tissues, becomes evident; for in those which are firmest in consistency, such as the bones and teeth, the water which they contain is actually in a solid form, not crystallized, as in the case of ice, or of saline substance which contain water of crystallization, but amorphous and solid, simply by the fact of its intimate union with the animal and saline ingredients of the tissue. The water is therefore, in these cases, solidified by the matter with which it is in union, as, under other conditions, solid substances may themselves become fluid when dissolved in water.

Different proximate principles being always mingled together, in this way, in the animal fluids, form their simplest or fundamental anatomical constituents, and hence the propriety of the title, *Fundamental Anatomy*, proposed by Robin for the study of this subject. Every tissue, furthermore, and even every anatomical form, no matter how minute, consists of a mixture of at least two, and generally many more, proximate principles intimately united with each other. Every muscular fibre, and even each filament of white fibrous tissue, not more than $\frac{1}{20000}$th of an inch in thickness, if isolated and examined, would be found to contain, on the one hand, water, and, on the other, a peculiar animal matter in union with it. Several saline substances are also always present, in varying quantity. Each red globule of the blood, not more than $\frac{1}{3000}$th of an inch in diameter, yields to a properly conducted anatomical analysis: 1st, water; 2d, two different animal substances (globuline and hæmatine); 3d, fats, in a free or saponified condition; and 4th, no less than eight different saline substances. It will readily be seen, therefore, that in a strictly scientific arrangement, the study of the proximate principles holds the first place, and that of the fluids, the microscopic elements, and the tissues, the second and the third. Practically, of course, it is different. Before analyzing any particular portion of the frame, we must become familiar with its figure and dimensions, so as to isolate it from the surrounding parts; but once having done so, the subsequent arrangement of our anatomical studies must be in the order which we have indicated above.

In the first division of the part devoted to microscopic anatomy proper, the author treats first of the *simple histological elements*, and afterward of the tissues. The simple histological elements are divided into—

1st. Homogeneous substance.
2d. Simple membrane.
3d. Simple fibre.
4th. Cells.

The first of these, or *homogeneous substance*, is an important anatomical element, owing to its wide distribution, and the large quantity of it which exists in the body. There is hardly a tissue or an organ which does not contain more or less of it. It is this which occupies the space between the cells of cartilage and between the filaments forming the bundles of areolar tissue. It unites the scattered cells and fibres which are imbedded in it into a continuous and more or less resisting mass. It is a substance which cannot be directly observed under the microscope, owing to its amorphous condition, and the uniformity of its appearance. Its presence is only indicated by observing that the cells and granules, or the fibres and fat globules seen under the instruments, are not floating loosely about the field, but are retained in their position by the intervening material. It is only in some instances where it is more or less granular in texture, as in the case of some kinds of cartilage, that it can be directly seen. Here, however, the above name ceases to be entirely applicable, as it is no longer a strictly homogeneous substance.

Notwithstanding the importance of this material, as an anatomical ingredient of the tissues, but very little can be said of it since it exhibits no definite characteristics under the microscope; its optical properties being, in fact, altogether negative in character. Very widely different substances, so far as regards their proximate constitution and their physiological properties, will present precisely the same appearance under the microscope, provided they be completely homogeneous. Even the plasma of the blood, when examined by the microscope, differs from the hyaline substance of cartilage only by its fluidity. The term homogeneous substance, therefore, is a general, not a specific term. It does not belong to any particular anatomical element, but only indicates a certain combination of optical properties which may be shared by several indifferently.

*Simple membrane* is a special form under which the above-named homogeneous substance shows itself. It occurs, according to the author, in the walls of cells, in the sarcolemma of muscle, and the tubular covering of nerve fibres. In it are often imbedded nuclei, as, for example, in the case of the capillary bloodvessels, &c. Very nearly the same remarks may be made as to the varying characters of this membrane in different tissues and organs, as we have already given above in regard to the homogeneous substance. It is, in fact, not identical in the different situations in which we meet with it, but is really to be regarded as often composed of different substances, presenting themselves under the same apparent form.

*Simple fibre* is also spoken of as one of the elementary forms of the animal tissues. The term "simple fibre" would be generally understood to include all fibres of homogeneous structure, such as those of white fibrous tissue, or of elastic tissue, as distinguished from the compound fibres of nerve, or of voluntary muscle. The author, however, restricts this term to the interlacing fibres of the membrane of the egg-shell, and those of coagulated fibrin, when it exhibits the peculiar condition known as "fibrillation." Understood in this sense, the simple fibre is hardly to be regarded as an organized anatomical element, since it is simply the effect of coagulation taking place in the fluid fibrin, and does not form an integral part of any of the permanent tissues. The fibrillation of fibrin, indeed, is regarded by many, and, we think, justly, as not, in any degree, a form or process of organization, but one merely of solidification—the coagulated fibrin being inert and useless for all purposes of nutrition or textural development; as much so as coagulated albumen or coagulated casein would be, under similar circumstances. Whenever new formations of a permanent character, therefore, show themselves subsequently to the deposit of a fibrinous exudation (such as vascular and fibrous pleuritic or peritoneal adhesions), it is not the coagulated fibrin which is supposed to be directly converted into these new tissues. The fibrin is thought to be reabsorbed after its exudation, as extravasated blood or serum would be, and as happens also, in some instances, with pus; while the new tissues are produced by a slow process of nutrition and growth, the materials for which are exuded gradually in a liquid form by the neighbouring parts, as the process of formation goes on. This is the view entertained by Robin, and one which has many points of evidence in its favour.

In the chapter on *Cells*, the author passes in review the anatomical character of the nucleus, nucleolus, and other parts of the cell structure. He regards the ovum, also, as a cell; with the germinative vesicle as a nucleus, and the germinative spot as a nucleolus. The adipose vesicle is, besides, included in the same category. Both these forms are considered by some microscopists as distinct from true animal cells, not only by their very much larger size, but also by the details of their anatomical organization. The peculiarities of pigment cells, in different parts of the body, are described in the same chapter, and finally those of cancer cells, cancer nuclei, &c. In regard to the latter the author adopts the views of Lebert, which have been received with such general favour by microscopists in this country as well as in France.

In the second division we have "Hydrology," or the description of the fluids of the human body, as follows: 1st, the blood; 2d, serous secretions and exudations; 3d, mucous and glandular secretions; and 4th, the cutaneous secretions. In treating of *mucus* the author describes certain microscopic elements, the "mucous corpuscles," which he regards as a regular product of development from the albuminoid ingredients of the fluid. These corpuscles, which present very different appearances in different kinds of mucus, are considered by some authors as characteristic of mucus, in the same manner as pus-globules are characteristic of pus. Many directions have accordingly been given, from time to time, for the purpose of enabling the observer to distinguish microscopically mucus from pus; but the characters relied on for this purpose were so indefinite that they have been found of but little practical utility. Many of the bodies described as mucus-corpuscles are undoubtedly pus-globules, accidentally present in the secretion; for nearly all mucous membranes produce pus, in greater or les abundance, on very slight irritation. Others are, as plainly, abnormal or imperfect epithelium cells, separated accidentally from the free surface of the membrane, and mingled with its fluid secretion. These facts have led some microscopists, of very high authority, to express the opinion that there is no such thing as a "mucous corpuscle," properly speaking; that is, that there is no constant and peculiar microscopic element characteristic of mucus, as the pus-globule and the blood-globule are of their respective fluids. Mucus, as they understand the term, is simply a mixture of watery, saline, and albuminoid ingredients, presenting no anatomical form to the eye on microscopic examination, any more than the serum of the blood, the synovial fluid or the pancreatic juice: but having a perfectly colourless and transparent appearance, and a more or less viscid consistency. We confess that this view seems to us altogether the most correct one; since when mucus is collected from situations where no foreign admixture has been possible, as where it has been taken, for example, directly from the cavity of the follicles of the cervix uteri, it is actually perfectly clear and transparent to the naked eye, and does not show any anatomical forms on microscopic examination. Mucous secretions become opaline and discoloured, just in proportion as they are mingled with other fluids of a different consistency, or with puriform and epithelial elements. Practically, however, we seldom observe them in a condition of complete purity, unless we take the trouble, as above mentioned, to obtain them directly from the situations in which they are produced.

Beside the microscopic elements of the animal fluids, the author speaks of their physical properties and their chemical constitution. A very important fact concerning these fluids, and one which could not have been anticipated beforehand, is the remarkable quantity in which some of them are secreted. The experiments of Bidder and Schmidt on the gastric juice in dogs, for example, led to the conclusion that the quantity of this fluid secreted in twenty-four hours was not less than $\frac{1}{10}$th the weight of the whole body; and though the same estimate applied to the human subject would give 12 to 18 pounds of gastric juice per day, these numbers are probably rather below than above the real quantity; for all the fluids are, generally speaking, more abundant in the human subject than in the lower animals. The difficulty which is generally felt in accepting so high an estimate of the daily quantity of these secretions as the true one, is, however, rather apparent than real; and it is possible that even a much larger quantity may be discharged daily by the glandular apparatus of the mucous membranes, without producing any ill effect on the system at large.

The author, for example, rejects some of these high estimates for a reason which we cannot but regard as altogether erroneous.

> "Experiments," he says (p. 199), "lead to the conclusion that dogs secrete in twenty-four hours an amount of gastric fluid equal to one-tenth their weight. This would give a range between 12 and 18 pounds for a man. Lehmann states, however, that 'according to several direct observations on a woman, as

much as *one-fourth* of the weight of the body has been found to be secreted as gastric fluid'!!! Of course this is all secreted directly from the blood, and the latter is estimated by Lehmann to constitute but *one-eighth* of the weight of the body. No further remark appears necessary upon his estimate of the gastric fluid."

It is in reality, however, not at all impossible that a quantity of gastric juice equal to 25 per cent. of the entire weight of the body should be secreted from the blood, which equals only 12½ per cent. of the same weight. For the gastric juice is not separated at once from the circulating fluid, and discharged from the body. It is secreted gradually; and almost immediately afterward begins to be reabsorbed, together with the elements of the food which it has digested and dissolved. Its secretion and reabsorption afterwards go on simultaneously; and the fluids which the blood loses by one process are immediately restored to it by the other. Examinations of the alimentary canal, while digestion is going on, show that there is comparatively but little fluid present in its cavity at any particular moment during this process; but, at the same time, the successive portions of gastric juice which enter the alimentary canal by exhalation, and then leave it by reabsorption, would amount, if taken together, to a quantity equal or superior to the entire mass of the blood. It is unnecessary to say, moreover, that in the experiments referred to by Lehmann, the entire quantity of gastric juice (7 pounds in the dog, 31 pounds in the human subject) was never actually withdrawn from the gastric fistula during any one day; but small quantities were taken at different intervals, and even in some instances on different days, at various periods after feeding; and the whole quantity estimated from these data. This estimate, furthermore, is fully borne out by the result of calculations as to the amount of food which a given quantity of gastric juice is capable of digesting.

The third division comprises the description of the tissues. The classification of the tissues which is adopted is into simple and compound; the *simple* comprising epithelium, yellow, and white fibrous tissues, and osseous tissue, including that of the teeth; the *compound* comprising areolar and adipose tissues, cartilages, muscle, nerve, membranes, vessels, alimentary canal, and the various glandular, respiratory, and sexual apparatuses, together with the organs of which they are composed. The simple tissues are defined to be those in which there is but one kind of simple histological element, while in the compound tissues there are two, three, or more of these elements mingled together. It will be seen that the author ranges osseous tissue, which would usually be regarded as compound, under the head of the simple tissues; considering it as constituted, not by lacunæ and canaliculi, and the soft substances which fill them, imbedded in a solid matrix—but by the solid matrix alone, this consisting, in its turn, only of the ultimate granules or minute angular corpuscles, welded together into laminæ, which have been described by Bowman and others.

We doubt, however, whether this granular aspect of the bony substance should not be regarded in the same light as that of cartilage, or as the granular texture of the substance of lymph and pus-globules, or of organic muscular fibres. The ultimate granules themselves, as they exist in the bony substance, are exceedingly minute. Their size is given (page 321) on the authority of Kölliker, as $\frac{1}{6000}$ of an inch. This is undoubtedly a misprint for $\frac{1}{600000}$, which is really Kölliker's measurement (.0002 of a line). Todd and Bowman give the size of these granules as $\frac{1}{6000}$ to $\frac{1}{14000}$ of an inch, and Tomes about $\frac{1}{16000}$ to $\frac{1}{20000}$ of an inch. The larger of these measurements, however, are derived from the examination of bone which has been burnt and crushed, or boiled in a Papin's digester; while those of Kölliker are taken from the direct examination of the osseous substance in its natural condition, and are, on that account, probably the most accurate.

In his description of the minute anatomy of the liver, the author has introduced the recent and extremely important discoveries by Dr. Beale, viz., the arrangement of the network of cell-containing tubes within the substance of the acinus, and their connection with the interlobular hepatic ducts; as well as the dilatations or glandular sacculi, seated in the coats of the biliary ducts in some of the lower animals.

The whole volume is plentifully illustrated with wood-cuts from the standard works of Lehmann, Bennett, Todd and Bowman, and the classical Microscopic Anatomy of Kölliker, and, altogether, gives a very full and complete account of the histology of the human body, so far as it is known at the present time. J. C. D.

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Art. XVI.—*The Principles and Practice of Obstetrics: Including the Treatment of Chronic Inflammation of the Uterus, considered as a Frequent Cause of Abortion.* By Henry Miller, M. D., Professor of Obstetric Medicine in the Medical Department of the University of Louisville. With Illustrations on Wood. 8vo. pp. 620. Philadelphia: Blanchard & Lea, 1858.

On the appearance of the original edition of Dr. Miller's obstetrical treatise, we were among the first to introduce it to public notice, and the highly favourable judgment of its merits then pronounced by us, has been fully sustained by the suffrages of the profession generally. In the new edition now before us, the entire work has been greatly enlarged and improved, so as to give it a form and a value that cannot fail to place it permanently among our standard systematic treatises on the theory and practice of obstetrics.

Without, perhaps, precisely the same elaborateness of detail and display of erudition which distinguish some of these, the work of Dr. Miller, by the clearness and distinctness with which each question embraced in it is discussed and elucidated, and the direct practical tendency of all its teachings, is one especially adapted as well for the use of the student as for consultation by the practitioner, on the spur of the moment, that he may confirm the correctness of his own conclusions, or detect their fallacy, by comparing them with those that have been arrived at from the experience and investigations of acknowledged experts.

The treatise commences with an account of the physical structure of the pelvis—its forms, regions, diameters, planes, and axes—and of the anatomy of the sexual organs of the female, and their physiological functions. To all these subjects due prominence is given, as constituting some of the most important points of that preliminary knowledge, an intimate acquaintance with which is essential to form the successful and safe obstetrician; and without a perfect familiarity with which no one should be permitted to undertake the management of a case of labour.

Dr. Miller adopts the modern view as to the menstrual discharge—that it is simply blood discharged by the vessels of the lining membrane of the